



Potential influence of climate change on vector-borne and zoonotic diseases: A review and proposed research plan

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Abstract:

BACKGROUND: Because of complex interactions of climate variables at the levels of the pathogen, vector, and host, the potential influence of climate change on vector-borne and zoonotic diseases (VBZDs) is poorly understood and difficult to predict. Climate effects on the nonvector-borne zoonotic diseases are especially obscure and have received scant treatment. **OBJECTIVE:** We described known and potential effects of climate change on VBZDs and proposed specific studies to increase our understanding of these effects. The nonvector-borne zoonotic diseases have received scant treatment and are emphasized in this paper. **DATA SOURCES and SYNTHESIS:** We used a review of the existing literature and extrapolations from observations of short-term climate variation to suggest potential impacts of climate change on VBZDs. Using public health priorities on climate change, published by the Centers for Disease Control and Prevention, we developed six specific goals for increasing understanding of the interaction between climate and VBZDs and for improving capacity for predicting climate change effects on incidence and distribution of VBZDs. **CONCLUSIONS:** Climate change may affect the incidence of VBZDs through its effect on four principal characteristics of host and vector populations that relate to pathogen transmission to humans: geographic distribution, population density, prevalence of infection by zoonotic pathogens, and the pathogen load in individual hosts and vectors. These mechanisms may interact with each other and with other factors such as anthropogenic disturbance to produce varying effects on pathogen transmission within host and vector populations and to humans. Because climate change effects on most VBZDs act through wildlife hosts and vectors, understanding these effects will require multidisciplinary teams to conduct and interpret ecosystem-based studies of VBZD pathogens in host and vector populations and to identify the hosts, vectors, and pathogens with the greatest potential to affect human populations under climate change scenarios.

Source: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2974686>

Resource Description

Early Warning System:

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure :

weather or climate related pathway by which climate change affects health

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Unspecified Exposure

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location:

resource focuses on specific location

Global or Unspecified

Health Impact:

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease, Zoonotic Disease

Vectorborne Disease: General Vectorborne

Zoonotic Disease: General Zoonotic Disease

Medical Community Engagement:

resource focus on how the medical community discusses or acts to address health impacts of climate change

A focus of content

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Resource Type:

format or standard characteristic of resource

Review

Resilience:

capacity of an individual, community, or institution to dynamically and effectively respond or adapt to shifting climate impact circumstances while continuing to function

A focus of content

Timescale:

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

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